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"*To the solid ground*
Of Nature trusts the mind which builds for aye."—WORDSWORTH

THURSDAY, MAY 3, 1877

THE UNIVERSITIES BILL

VERY little light has been thrown on the future of Oxford and Cambridge by the discussions in the House of Commons last week and this week. Harassed as they are by the difficulties of the Eastern question, our legislators could not, perhaps, be expected to devote serious thought to the fortunes of higher education in England, but as Mr. Knatchbull-Hugessen said, the debate was "certainly more suited to the debating societies of Oxford and Cambridge than to the arena of the House of Commons." Lord F. Hervey, who opened it, had little weightier to remark than that Mr. Grant Duff was "no doubt a very learned and superior person," and Mr. Grant Duff's chief contribution was the venerable witticism that Lord F. Hervey ought to be carried round the country by himself and other advanced reformers, as "the shocking example" of the results of the present system. Mr. Trevelyan delighted the House and the country by the amusing patriotic statement that "It would not be possible to find in any European University forty mathematicians equal to the Wranglers in the Cambridge Mathematical Tripos, or twenty classical scholars to compare with those who stood first in the Classical Tripos at Cambridge or in the School of *Literæ Humaniores* at Oxford;" and with an equally cheerful indifference to the facts Mr. Lowe replied that the teaching of the Universities was "simply disgraceful." When we add that there was much dispute whether the glories of Lord Macaulay, who was not "a resident fellow of Trinity College, Cambridge," should be credited to that University, and that Sir William Harcourt was delighted to hear that an overworked judge like Sir Alexander Cockburn could find time, in spite of his work, to undertake the arduous office of chairman, which would require the "constant and daily attention of one having entire and absolute leisure," we sum up most of what was interesting and novel in the discussion before going into Committee.

On two questions, however, which are of speculative importance, much incidental light was thrown. The Bill gives large enabling powers to the Commissioners, and although, as "An Oxford Man" pointed out in NATURE (vol. xv., p. 391), it is very doubtful whether large reforms can be effected even on the initiative of a strong-willed and clear-headed Commission; it is perfectly certain that little or nothing can be done if the Commissioners are feeble and without origination. In their preparation of schemes for each of the forty colleges they are to be associated with three residents from the college itself, and it is only from the colleges that they can get money to effect any reforms. It is important therefore to understand what are the views of the Government with regard to the reforms which are practical or possible, because it is to advance these views that the Commissions have been selected. Afterwards, everything depends on the Commissioners themselves, on the spirit in which they have undertaken their task, and on the diligence, ability, and discretion with which they are likely to execute it.

The Opposition offered no formal objection to any of the names proposed by the Government, but they suggested the addition of three names to the Oxford and of two names to the Cambridge list. For Oxford they proposed Prof. Bartholomew Price, Prof. Huxley, and Prof. Max Müller, and for Cambridge Dr. Bateson, the master of St. John's College, and Dr. Hooker, the president of the Royal Society. The addition of these names would have greatly strengthened the Commissions, and those who are anxious to see the Universities question treated in a generous spirit and with a wide knowledge of the subject might have been reasonably hopeful of good results. To our mind it is a fatal objection to the Commissioners as they stand that they include no members who are not alumni of the Universities on which they are to sit. Prof. Huxley and Dr. Hooker would have been of the utmost service, because they would have approached University questions from the point of view of men whose lives have been spent outside the Universities. It is certainly important for the Commissioners to have a practical acquaintance with working details, but that would surely have been sufficiently guaranteed by the presence of nine University men on each Commission even though one outsider had been added to each. Prof. Huxley has sat on the Scotch Universities Commission, and has had the largest experience of teaching at unrestricted institutions like the School of Mines and South Kensington. Dr.

rinthodont but not Pycnodont We have Protoplasma but neither Protoplasm nor Protoplasmic. Photosphere we find, but not Chromosphere, nor Corona in its solar application, and neither Heliostat nor Siderostat. The dictionary contains various terms in electricity and magnetism, but not Magneto-Electric, Electro-Biology, Quantivalence, Anode, nor Cathode. Darwinian and Darwinism, long since used as current common terms, find no place here; and no one would guess from the definitions of Evolution and Development the immense significance which these terms have assumed in recent times.

We could give many instances of similar caprice in the admission of scientific terms, but our space does not admit of it. But it is not alone in this class of terms that the vocabulary appears to us to be defective; many words are wanting which, we venture to think, any man of common sense would look for in a modern English dictionary of the pretensions of that edited by Dr. Latham. Under Mule a reference is made to the spinning-jenny, but under neither Spinning nor Jenny is the use of the term explained. Readers of Arctic narratives will look in vain for an explanation of Ice-foot and Ice-master, and the reader will not be surprised at the omission of Snider, Whitworth, and Mitrailleuse. Can any sound reason be given for omitting such a word as Croquet? And where are we to look for an explanation of such national terms as Over and Bye, if not in the most recent of English dictionaries, which registers the "cricketal" signification of Stump? The work is evidently not meant for circulation in America, if we may judge from the absence of all Americanisms, even those which have become current coin in the English tongue, such as Bunkum, Caucus, Mocassin. Might not such words as Ecchymosis and Deoppilation have been spared (who is likely to look for them?) in favour of some or all of the terms referred to. Many words found in Tennyson, Morris, and Swinburne are marked as "obsolete," showing the danger of using the epithet at all.

The etymology seems to us unsatisfactory. To words whose origin is simple and obvious two or three lines are sometimes devoted; while of others whose etymology is certain enough, but which it would have taken some time and trouble to trace, no satisfactory information is given. What satisfaction is it to be told simply that Abandon comes from French *abandonner*, especially when the history of the word can be so beautifully traced? There is a like want of proportion in the definitions, which are in most cases extremely meagre, but in some cases capriciously and unnecessarily diffuse. In the arrangement of the various definitions under each word, moreover, we fail to discover, as a rule, any logical or historical method. In this as in some other respects Dr. Latham has stuck too closely to the old lines of dictionary construction, and missed the opportunity of compiling a work which might have cast all other similar works into the shade. We cannot say that it has dethroned either Webster or Worcester, unsatisfactory in many respects as these are; and there are two or three smaller and cheaper dictionaries, which we venture to think would be more useful to the general reader. The field is still unoccupied, for Dr. Latham's work can never, in our opinion, serve as the standard dictionary of our language. The work is handsome and well printed, and the "Historical Sketch of the English Language" is thoroughly satisfactory.

GUILLEMIN'S "WORLD OF COMETS"

The World of Comets. By Amédée Guillemin. Translated and Edited by James Glaisher, F.R.S. (London: Sampson Low and Co., 1877.)

MR. GLAISHER mentions that he was anxious that M. Guillemin's interesting work upon comets should appear in our language, from the fact of there not being so far any volume that occupied the ground covered by it, while, it may be added, that the recent important advances in this branch of the science renders a pretty complete summary of progress in late years a most desirable help and guide to the student, scattered as the reports of such progress almost necessarily are in the publications of scientific societies and in periodical scientific works at home and abroad.

The greater portion of the volume before us relates to those particular departments of the subject which may be expected to interest the general reader. The historical portion, especially in the earlier ages, when comets were regarded as omens, good or bad, to the time when Newton developed the laws by which their motions are governed, naturally commences the work; then follow chapters upon their orbits, the periodical comets from the short revolution of Encke's comet, to the revolutions of several thousands of years which have been assigned with a greater or less degree of probability to other of these bodies; more particular descriptions of several great comets in recent times, as the comets of 1744, 1811, 1843, 1858, 1861, and the great comet of Coggia in 1874, which made its appearance just prior to the publication of M. Guillemin's treatise. It is, however, in what we must term cometary physics that the volume is most complete, and in which its interest and probable usefulness will mainly consist. The theories of Olbers, Bessel, Faye, Roche, Tyndall, Tait, and others are noticed in a popular and readable style, and are fairly considered collectively, though differences of opinion must still prevail with regard to any inferences to be drawn from them. The researches of Dr. Huggins, Prof. Secchi, MM. Wolf and Rayet, in the spectral analysis of the light of comets, and particularly of Coggia's Comet of 1874, are described, and to these results, as collected by M. Guillemin, Mr. Glaisher has added an important article by Mr. Lockyer, which appeared while the great comet of 1874 was still visible, and in which are detailed the results of spectroscopic examination of the light of the comet with the aid of Mr. Newall's great refractor. The editor has also made some very desirable additions to M. Guillemin's chapter on "The Common Origin of Shooting Stars and Comets."

The work concludes with a list of elliptic comets and their elements and with a general catalogue of cometary orbits to 1876.

We have said that probably the chief interest and value of M. Guillemin's "World of Comets" will be found to consist in the extensive portion of his volume devoted to cometary physics, to the theories which have been advanced to explain their varied aspect, and the formation of the enormous trains by which some comets are accom-

panied. The comets of short period—a most interesting class—might well have been treated in somewhat greater detail, and in this division of the work we note several oversights. Thus it is stated that the researches of Dr. Axel Möller upon the motion of Faye's Comet, show that that body supports the theory of a resisting medium, first supposed to be indicated by Encke's investigations relating to the comet which bears his name ; but as long since as the year 1865 Dr. Axel Möller had relinquished this idea, and from a rigorous discussion of the observations at the first three appearances, alluded to by M. Guillemin, had succeeded in representing the observations by the simple application of the planetary perturbations, without any hypothesis whatever, and his later researches have also negatived the existence of any trace of the effect of a resisting medium upon the motion of this comet. There is some ambiguity in the definition of the element π, or the longitude of the perihelion in the orbit of a comet ; from the explanation given by M. Guillemin it might rather be inferred that the longitude is reduced to the ecliptic, which is not the case. The comet discovered by De Vico at Rome, February 20, 1846, is duplicated, appearing first on p. 140 with a revolution of fifty-five years, and again on p. 143 with a period of seventy-three years ; the former period resulted from one of the earlier calculations. Pigott's comet of 1783 is named amongst the contents of a chapter p. 133, but there is no further reference to it. In the catalogue of orbits, there are several cases since the year 1866 where the inclination has been reckoned over 90°, as is frequently the case amongst the German computers, and with the unnecessary addition of the letter R in the column headed "direction of motion." To render these orbits consistent with the method hitherto in general use, and indeed adopted exclusively in the preceding part of the catalogue, the inclination given requires to be subtracted from 180°, and for the longitude of perihelion given in the fourth column, $2\,\Omega - \pi$, should be substituted.

These, however, are small defects which may easily be avoided in a future edition. As a whole, M. Guillemin's "World of Comets" must prove a welcome aid to the student on entering upon this branch of astronomy.

J. R. HIND

OUR BOOK SHELF

Fownes's Inorganic Chemistry. Edited by Henry Watts, B.A., F.R.S. Twelfth Edition. (London : Churchills.)

IN the present edition of this well-known manual the publishers have, wisely as we think, determined to divide it into two parts. In its old form the work had grown to be as unhandsome and cumbersome a volume as could be well imagined ; like an overgrown yeast-cell it was obviously getting too big to hold together much longer, and many a student on his way to and from the lecture-room must have wondered, as he struggled to get the thick squat book into a comfortable carrying position, why the process of gemmation was so long delayed.

The present volume, which treats of physical and inorganic chemistry, contains a considerable amount of new matter, and may be regarded as an accurate representation of the present state of knowledge on these subjects. Among the more important additions we may mention an account of Mendeleeff's Laws of Periodicity, and a very good digest of what is known concerning the new metal gallium and its compounds ; this element is associated with indium, with the probable atomic weight 68, as already indicated by M. Mendeleeff. The position of the cerite metals is also determined in accordance with the specific-heat estimations recently made by Hillebrand. On the other hand, it may be doubted if iodine tetrachloride has any real existence, and Michaelis has proved that the reaction $3PbSO_4 + 2POCl_3 = 3SO_2Cl_2 + Pb_3P_2O_8$ is not realised in practice. On the whole, however, the work fully maintains its reputation as a faithful exponent of the state of contemporary chemical knowledge. T.

The Microscopist : a Manual of Microscopy and Compendium of the Microscopic Sciences. Third edition. By J. H. Wythe, A.M., M.D. (London : Churchill, 1877.)

IT is now some twenty-five years since the first edition of this work appeared, and as the author himself remarks in his Preface, it is no small compliment to a work of this kind that for so many years it should hold a place among works of reference, although surrounded by larger and more pretentious volumes. For this third edition the book has been entirely rewritten, the advancement of microscopical science having naturally rendered considerable enlargements necessary. Still the work retains its principal qualities as before, viz., the precise and clear language, the absence of all unnecessary verbiage, and last but not least, the excellent arrangement of the contents. Thus after a brief reference to the history and importance of microscopy, we have able descriptions of the microscope itself and its accessories, followed by general remarks on its use and the more modern methods of microscopic investigation. Then, after a short chapter on the mounting and preserving of objects, we come to well-written and richly illustrated treatises on the application of the instrument in the different sciences, each science being spoken of in turn and in a separate chapter For the beginner this arrangement is of special value, : it enables him quickly to form a general idea of the whole domain of microscopy. Mineralogy and Geology are followed by a chapter on Microscopic Chemistry ; then the author treats of Microscopic Biology, devoting a chapter to Vegetable Histology and Botany, one to Zoology, the next to Animal Histology, and the last to Practical Medicine and Pathology.

The illustrations are original to a great extent ; many also are taken from the works of Carpenter, Frey, Stricker, Billroth, and Rindfleisch. The larger plates, of which there are twenty-seven, are particularly well drawn, and add greatly to the general excellence of the work.

LETTERS TO THE EDITOR

[*The Editor does not hold himself responsible for opinions expressed by his correspondents. Neither can he undertake to return, or to correspond with the writers of, rejected manuscripts. No notice is taken of anonymous communications.*

The Editor urgently requests correspondents to keep their letters as short as possible. The pressure on his space is so great that it is impossible otherwise to ensure the appearance even of communications containing interesting and novel facts.]

Hog-Wallows and Prairie Mounds

JUDGING from the descriptions of these deposits, they must be nearly, if not quite, identical with those which I described in a paper on "The Ancient Glaciers North and East of Llangollen," read at the British Association, 1865. These are a series of heaps of glacial drift covering more or less completely the habitat of Cheshire Cheese, *i.e*, the Vale Royal itself, and the slopes which extend from it to those Welsh Mountains that are so prominently seen from Chester. These mounds vary in size and shape according to their position. They are very well defined and numerous in the valley of the Alyn, between Wrexham and Mold, where they have the form of oblong hog-back mounds usually lying parallel to each other with their longer axes (if I may use the term) nearly at right angles to the general slope of the surface. They may be counted by hundreds, and in some parts are so near together as to form a series of connected undulations. They are largest and most abundant opposite the mouths of the lateral valleys opening into the main valley of the

in NATURE last week, the council of the Royal Astronomical Society have guaranteed 500*l.* for the expenses of Mr. Gill's expedition. Ascension has been fixed upon, not without a careful consideration of probable meteorological conditions about the time of the opposition of Mars in September, in which it is understood the records of the Meteorological Office have been of the greatest service, and in fact, have induced Mr. Gill to fix upon Ascension for the site of his temporary observatory in preference to St. Helena, the astronomical condition being about the same for the two islands, *i.e.*, their latitudes not differing much from the declination of the planet when nearest to the earth, so that it is observable at a considerable hour-angle on both sides of the meridian.

The *modus operandi* proposed by Mr. Gill, is as follows:—two stars, *a* and *b*, one preceding and the other following the planet, are selected for each night of observation, and their angle of position and distance relative to the planet are computed roughly for 4h. E. and 4h. W. hour-angle, and the right ascension and declination of the middle point between star and planet; so that the proper stars of comparison are readily found. The heliometer axis is directed to this middle point, the position-circle set to the position-angle, and the segments set to the approximate distance. The observer finds in the field of view a star and the planet; by turning the handle by which the segments are moved in *distance*, the images of star and planet are made to move relatively to each other in the direction of a line joining the objects, while if the position-handle is turned, the images move in the direction of a line perpendicular thereto. Suppose that the star *a* is viewed through segment A, and the planet through segment B. According to Mr. Gill's usual practice the observation would proceed thus:—

I. Measure of position-angle.
II. Measure of distance, both limbs.
III. Reverse segments, and view star by segment B and planet by segment A.
IV. Measure position-angle.

This constitutes one measure.

V. Repeat this process with star *b*.
VI. Reverse position-circle and repeat the comparison with star *b*.
VII. Compare again with star *a*.

This constitutes a complete symmetrical set, which Mr. Gill has found can be secured on an average in 1h. 30m., sometimes in 1h. 10m., or if there be interference from cloud it may occupy 2h.

In the measure of a position-angle, by a movement of the handle for distance, the star may be made to move, relatively to the planet along the line of separation of the lenses, so that the star successively occupies positions 1, 2, 3 . . . 3, 2, 1, &c. This motion may be very slow and the position-circle being set so that the motion of the planet completes the bisection, the observer has only to go on moving the star slowly till the limb is seen to symmetrically bisect the star (the time of which is noted) precisely as Jupiter's limb bisects one of his satellites.

The measure of distance is conducted with equal care, but is not so readily explained without a diagram. Mr. Gill finds his method possesses very great delicacy. It sometimes happens that it is not possible to find a star sufficiently bright to compare with Mars in his full light. In such cases the brilliancy of the planet can be easily kept down by a wire-gauze screen, which, by an arrangement at the eye-end, can be laid over either segment of the object-glass and at any angle thereto.

In a letter to M. Leverrier, published in the *Bulletin International* of April 27, Mr. Gill states that the observations of Juno, which he made with Lord Lindsay at the Mauritius with the same heliometer, showed that the determination of the diurnal parallax by measuring with this instrument the distance of the planet from a star preceding and a star following is susceptible of an extreme precision, and he found the probable error in the determination of the planet's position for each complete observation of the morning or evening did not exceed $\pm 0''{\cdot}075$. Lord Lindsay has stated that the value of the solar parallax, resulting from these observations of Juno (a single discordant one only being rejected) is $8''{\cdot}82$, which approaches near to Prof. Newcomb's value, $8''{\cdot}85$, adopted provisionally by the German astronomers, and to M. Leverrier's theoretical determination, $8''{\cdot}86$. This sufficiently indicates the utility of the method, and Mr. Gill intends to avail himself of the close oppositions of the minor planets Ariadne and Melpomene during his visit to Ascension to obtain values of the parallax by observation on the same principle.

COMET 1877 II. (WINNECKE, APRIL 5).—This comet may be expected to prove a fine telescopic object during the absence of moonlight in the circumpolar sky, with its stellar-looking nucleus and double or broad fan-shaped tail. The annexed positions for midnight at Berlin are from elements by Herr Plath, of Hamburg, and have been received from Prof. Winnecke:—

	R.A.	Declination.	Log. Distance from Earth.
	h. m. s.	° ′ ″	
May 4 ...	23 26 5 ...	+65 59·2 ...	9·99601
5 ...	23 36 41 ...	68 7·2 ...	9·99640
6 ...	23 49 22 ...	70 11·6 ...	9·99741
7 ...	0 4 45 ...	72 11·3 ...	9·99902
8 ...	0 23 31 ...	74 4·5 ...	0·00123
9 ...	0 46 49 ...	75 48·8 ...	0·00400
10 ...	1 15 34 ...	77 21·5 ...	0·00732
11 ...	1 50 47 ...	78 38·3 ...	0·01116
12 ...	2 32 59 ...	79 35·1 ...	0·01549
13 ...	3 19 55 ...	80 7·8 ...	0·02028
14 ...	4 8 57 ...	+80 13·6 ...	0·02548

The following orbit has been calculated by Mr. Hind from observations at Strasburg, on April 5 and 25, and at Berlin and Leipsic on April 14:—

Perihelion Passage, 1877, April 17·64687, G.M.T.

Longitude of Perihelion	253° 30′ 9″	Mean Equinox,
,, Ascending Node ...	316 33 53	1877·0
Inclination	58 54 22	
Distance in Perihelion	0·950250	

Heliocentric motion—retrograde.

These elements represent the observations during the interval very closely.

NOTES

M. FLAMMARION has been authorised by M. Leverrier to use one of the largest refractors of the Paris Observatory for the investigation of the motion of double-stars round a common centre of attraction. This liberality on the part of the chief of the Paris Observatory is highly creditable. M. Leverrier, indeed, is desirous of placing the immense means of investigation possessed by the observatory at the service of a number of independent workers not belonging to the staff of the establishment, but who have given solid proofs of their zeal and capacity for research in some particular science. His ambition is to create at the observatory a national astronomical institution where qualified scientific men may find ample means for following their own special studies.

SIR DAVID MONRO, late Speaker of the House of Representatives in New Zealand and an active promoter of science in that colony, died at Nelson, New Zealand, on February 15. He graduated in Medicine in the University of Edinburgh in 1834, where his great grandfather, grandfather, and father successively held the Chair of Anatomy. He devoted the leisure of an active political life to the pursuit of botany, and by his discoveries, which were published by Dr. Hooker in his "New Zealand